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ABSTRACT

This study examined gender differences and the process of Internet-assisted inquiry in a single-sex, technology-enhanced environment as female students pursued research topics within a math and science framework. Five group case studies consisted of various configurations selected from a cohort group of students and teachers representing two city school systems, five county systems, and one private school. Participants were teachers and female students representing grades 5 through 8 from a purposive sample in a lab-type setting where they engaged in group inquiry with the assistance of networked computers, peers, teachers, and other resources available on a university campus. A qualitative approach to research was implemented using the constant comparative method of data analysis. Data in the form of observational field notes, transcripts of video tapes, artifacts, and photos resulting from a two-week summer workshop revealed interesting findings regarding student behaviors while interacting with computers in a single-sex environment. Results from the study indicated that female students--when interacting within a single-sex environment--display similar behaviors as male students do when engaging in technology-enhanced activities. Additional findings show that the classroom teacher, operating within a theoretical framework and personal educational philosophy, can either hinder or enhance student processes. (Contains 20 references.) (Author/AEF)

A League of Their Own: Gender, Technology, and Instructional Practices

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Abstract

The study—funded through a Dwight D. Eisenhower Professional Development Grant—examined gender differences and the process of Internet-assisted inquiry in a single-sex, technology-enhanced environment. Five group case studies consisted of various configurations selected from a cohort group of students and teachers representing two city school systems, five county systems, and one private school. A qualitative approach to research was implemented using the constant comparative method of data analysis. Data in the form of observational field notes, transcripts of video tapes, artifacts, and photos resulting from a two-week summer workshop revealed interesting findings regarding student behaviors while interacting with computers in a single-sex environment. Results from the study indicate that female students—when interacting within a single-sex environment—display similar behaviors as male students do when engaging in technology-enhanced activities. Additional findings show that the classroom teacher, operating within a theoretical framework and personal educational philosophy, can either hinder or enhance student processes.

Margaret Mead (1971) believed that the ideal culture nurtured its members and made a place for every human gift. In his book, *Multiple Intelligences: Theory in Practice*, Howard Gardner (1993) suggests that the purpose of school should be to develop intelligences and to help each student reach vocational and avocational goals appropriate to their particular spectrum of intelligences. The theory of multiple intelligences is one of cognitive functioning. The theory proposes that all students possess eight intelligences—which range from logical mathematical to linguistic. If these intelligences are to be advanced, students must be given equal and ample opportunities to develop and achieve within a non-threatening classroom

environment. Both Mead and Gardner's work speak to all students, however there is one group in the student population—the female student—whose intellectual gifts are not being addressed or nurtured to the degree that some feel they should. Pipher (1994) illustrates this point further when she quotes Stendhal as saying, "All geniuses born women are lost to the public good."

Initial research conducted by the American Association of University Women (1992) shows that girls in general receive an inferior education to boys. The report, *How Schools are Shortchanging Girls* (1995) reveals that girls receive less attention; are pursuing less math-related careers than boys; and in some cases are more likely to be rebuffed by teachers. It is these forms of subtle gender bias that are preventing girls from achieving and excelling in the areas of math, science, and technology. Although studies show that there are no innate differences in ability between men and women, a very significant difference can be traced in participation and achievement in these curriculum areas (Silverman & Pritchard, 1996). Caine and Caine (1994) point out that this may be attributed to specific brain functions that are employed while learning. Research conducted by Sonnert and Holton (1995) further support this notion. Their findings show that gender disparities in the field of science may be attributed to: a) *a deficit model* that says women are treated differently and b) *a difference model* that says women act differently. In addition, since learning is often influenced by emotions, teaching methods should connect, relate, and encourage innate abilities and interests (Belensky, Clinchy, Goldberger & Tarule, 1989; Caine & Caine, 1994; Silverman & Pritchard, 1996). When the results of the TIMSS (*Third International Math and Science Study*, 1997) became available to the general public, it became evident that girls were scoring slightly lower than boys were in the areas of science and mathematics. Nawaz (1996) and Pipher (1994) attribute some of this to the fact that many educators believe there are social pressures and cues early in life that steer girls away from these areas. In fact, not only do girls score traditionally lower on standardized science and math tests, findings indicate that girls view these subjects as "male dominated."

Research in the areas of gender differences, performance, and computers has not been as extensive as studies that examined gender differences with regard to performance in the areas of math and science. However, research that has been conducted shows that girls view the use of computers as a "male-oriented" activity (Yelland, 1998). Further findings reveal that there are definite differences based on gender with regard to performance and computer-oriented tasks (Craig, 1997; Hoyles, 1998; Hughes & Mac Leod, 1986). This body of research indicates that—when working with computers—boys appeared more confident in their problem solving abilities; were more likely to associate computing with a high level of academic ability; engaged in a type of parallel conversation while computing; and were more apt to share solutions and problems with other boys.

In contrast, girls were less confident in their problem solving abilities; engaged in conversations centering around the task at hand; were more apt to seek assistance from an adult rather than another student; and appeared more confident while engaging in online conversations via chat rooms (Craig, 1997; Hoyles & Sutherland, 1989). Furthermore, Schrof (1993) points out that differences such as these create a gender-sorting machine of sorts—one that needs to be dismantled in order to ensure that girls have the opportunities that everyone assumes they already have. Jane

Daniels, NSF gender equity advocate, reiterates this by making the statement, "How can we imagine, in this highly technical world, that our economy won't collapse if we fail to fully develop half of our nation's brainpower" (Schrof, 1993, p. 42).

Examining Single-Sex Environments and Computer Utilization

While initial research conducted by the AAUW (1995) appears to be common knowledge among the educators in public schools today, there remains a discrepancy between current practices and female students' attitudes and achievement in math, science, computer use, and test scores. Although an AAUW (1998) follow-up study indicates that there is not much difference in attitudes and achievement when female students are placed in a single-sex private school environment, prior research prompts several questions regarding the public school classroom such as: (a) Would the attitudes of female students regarding math, science, and computers change if given the opportunity to work within an all-girl environment? (b) Would female students behave the same as they would in a male-female environment if given the opportunity to engage in computer-assisted research within a single-sex group? and (c) What classroom implications, if any, would emerge from such a study that would assist classroom teachers in meeting the needs of this particular student body? These four queries acted as overarching themes for data collection throughout the study.

The study utilized these initial questions to examine, document, and provide a rich, thick, and dense description of how female students operated and interacted with each other and with teachers in a single-sex environment as they pursued research topics within a math and science framework. Using a qualitative approach outlined by Bogdan and Biklen (1992), the researcher became a participant observer in conducting five group-case studies consisting of female students and teachers representing Grades 5 through 8 from a purposive sample in a lab-type setting where they engaged in group inquiry with the assistance of networked computers, peers, teachers, and all other resources available on a university campus.

Data sets were collected through observational field notes of student-student interaction and student-teacher interaction, transcripts of video and audiotapes of each session, student journals, pre- and post-attitudinal surveys, media surveys, interest questionnaires, and a photo essay. The project, funded through an Eisenhower Professional Development Grant, was designed as a two-week summer institute for both teachers and students. The first week consisted of an awareness training workshop where teachers examined current research regarding gender differences, math and science achievement, and computer utilization, in order to design student inquiry project guidelines that incorporated math, science, and Internet resources. The student inquiry projects focused on topics in physical science, geometry, and measurement, that the teachers felt would be of particular interest to adolescent girls. Teachers then field-tested their materials with 5th through 8th grade female students during the second week of the project. Observations and data collection spanned the two-week period. Library and Internet access provided students with additional research material as needed.

Findings

In reflecting on the processes involved when conducting qualitative research, Eisner (1998) writes that vision depends upon the existence of qualities that can be seen—these qualities may be aspects of the world we inhabit or products of our imagination. Both the content of the world and the content of our imagination are dependent on these qualities. One of the initial questions that framed the study converged on how teachers would react to female students within a single-sex technology-driven environment. The question implied a focus on instructional practices as well as attitudes, which in turn have the potential to influence the learner. This focus emerged into a unique phenomenon that would drive the study into an alternative area.

In an attempt to offer insights into the milieu, general findings are presented in the chronological order in which they occurred—beginning with findings concerning students and progressing to findings concerning teachers. As data collection took place, the researcher recorded daily reflections as a means of gaining understanding as well as to compile a list of implications for classroom teachers. In addition to daily entries in an observational field journal, videotapes of each session provided additional information to aid in understanding the nature of transactions between students, teachers, and computers. Two graduate research assistants assisted the researcher in the process of collecting data. Entries from observational field journals were compared and used in the process of triangulation of data.

One the first day of the week-long session, students were asked to complete attitudinal surveys regarding their perceptions of science and math. The pre-workshop session survey revealed that 40 out of 52 participants felt confident in their ability in the areas of science and math. However, 48 out of 52 felt that science, math, and computers were very "male oriented" areas. Responses from the post-workshop surveys showed that when asked the same questions, all of the participants felt very confident while working with subject matter in science and math and in utilizing the Internet for research purposes. At the culmination of the week-long workshop, only half of the students indicated that math, science, and computers were "for boys" (Table 1).

Pre-workshop survey participant responses to "teacher influence" questions with regard to success in math and science indicated that the role the teacher played in the math and science classroom had a direct influence on students' perceptions of their abilities in these areas. Entries from observational field notes further indicate that at the beginning of the workshop, teachers had a great deal of influence on the success and performance of student participants. The following entries were recorded on the first day of the workshop:

Table 1. Student Responses to "Male-Orientation" Pre-Workshop and Post-Workshop Attitudinal Survey Questions #9, #11, #24, & #28

Question	Pre-Workshop Response	Post-Workshop Response
#9. It's hard to believe that a female could be a genius in math, science, computers.	48 = strongly agree 4 = disagree	26 = strongly disagree 10 = strongly agree 16 = agree
#11. When a woman has to solve a problem in math or science, she should ask a man for help.	48 = strongly agree 4 = disagree	20 = strongly disagree 6 = disagree 15 = strongly agree 11 = agree
#24. I would have more faith in the answer to a math or science problem solved by a man than a woman.	46 = strongly agree 2 = agree 4 = disagree	25 = strongly disagree 1 = disagree 6 = strongly agree 20 = agree
#28. Females are as good as males in math and science.	40 = strongly disagree 12 = disagree	26 = agree 26 = disagree

Note: Surveys were administered to 52 participants. Responses indicated are based on the following scale: *strongly agree, agree, disagree, strongly disagree*

> Researcher's Entry—Monday, June 8, 1998
>
> *"I'm nervous about presenting my project. I'm scared of messing up and having my teacher see me. She thinks I can't put this together as it is."*
> (student participant comment—informal conversation)
>
> Researcher's Entry—Monday, June 8, 1998
>
> *"She (teacher participant) thinks we can do this, so we better be good when we show her what we've done. Look (at project design form) what do you think? Will she like it?"*
> (two students' informal conversation while working on project design)

However, at the end of the workshop, only seven out of 52 student participants still felt that it was the teacher who influenced their perceptions about their ability and success when engaging in science and math activities (Table 2).

Table 2. Student Responses to Pre-Workshop and Post-Workshop Attitudinal Questions #30 and #26

Question	Pre-Workshop Response	Post-Workshop Response
#30. I feel math/science teachers ignore me when I try to talk about something serious.	52 = strongly agree	7 = strongly agree 40 = strongly disagree 5 = disagree
#7. It's hard to get math/ science teachers to respect me.	52 = strongly agree	2 = strongly agree 5 = agree 44 = strongly disagree 1 = disagree

Note: Surveys were administered to 52 participants. Responses indicated are based on the following scale: *strongly agree, agree, disagree, strongly disagree*

In addition to the attitudinal survey, students were asked to complete an interest-information survey before attending the workshop. After examining responses to the information survey open-ended question, "What type of profession would you like to strive for after completing high school?" the researcher compiled a list of student-selected career categories (Table 3). The categories—generated by student participants—were used to design a "media-enhanced" version of the original interest information survey. The new instrument incorporated pictures of media and film stars that represented the girls' career choices on television and in popular films. The media-enhanced survey was administered to the 52 participants, who were asked to select their top three career choices once again. The results were extremely different from the first set of data gathered regarding future careers. The top three career choices—indicating the power of the media—are displayed in Table 4. These findings indicated that the media certainly do have power in shaping young girls—physicians, scientists, and astronauts were no longer the top choices of the group, although previously stated on the original survey.

Table 3. Categories of Student Responses to "Career" Information Survey Open-Ended Question, "What type of profession would you like to strive for after completing high school?"

Category	Number of Students Responding to Specific Category
Physicians	22 students indicated "physician" as top career choice
Teachers	15 students indicated "teacher" as top career choice
WNBA Star	2 students indicated "WNBA star" as top career choice
Veterinarians	4 students indicated "Vet" as top career choice
Astronauts	2 students indicated "Astronaut" as top career choice
Scientists	3 students indicated "Scientist" as top career choice

(table continues)

Table 3. (continued)

Category	Number of Students Responding to Specific Category
Singer	1 student indicated "Singer" as top career choice
Model	2 students indicated "Model" as top career choice
TV Star	1 student indicated "TV Star" as top career choice

Note: Survey administered to 52 participants prior to attending workshop.

Table 4. Student Selected Career Choices—Media-Enhanced Survey

Career	Selected as "first"	Selected as "second"	Selected as "third"
Model—represented by Claudia Schiffer	27 students	19 students	6 students
TV Star—represented by Jennifer Aniston	18 students	21 students	13 students
Singer—represented by Mariah Carey	7 students	40 students	5 students

Note: Media-Enhanced survey administered to 52 participants. First, second, and third career choices are indicated.

The first major findings concerning students and their interactions with each other and with computers indicated that girls did behave very differently in the absence of boys. Prior studies conducted in male-female settings (Craig, 1997; Hoyles, 1998; Hughes & MacLeod, 1986) indicated the blatant differences between girls and boys as they interacted with computers.

In general, the single-sex group showed none of these differences. In the area of seeking assistance, female students sought help from each other first, then if all else failed went to an adult in much the same way that male students did in previous studies. Group preference—as indicated in findings from studies examining student behaviors in mixed gender settings—showed that boys favored working in groups of three or more while girls worked in teams of two or individually. Throughout the week-long summer session, however, female student participants—when given the choice—elected to work in groups of three or more.

While working with computers and utilizing the Internet for research, the conversation that took place within the groups of girls ranged from the project at hand to what they did the night before to family business. This was also similar to the conversation reported as taking place by male students in previous studies (Table 5).

Table 5. Topics of Student Conversation While Working at Computers

Number of Students in Conversation	Topic of Conversation
Group #1—6 female students from a suburban middle school	"Shopping at 'The Gap'"
Group #2—5 female students from a rural elementary school	"Being in college—living in a dorm"
Group #3—3 female students from a suburban middle school	"Phillips' Bookstore—MTSU campus"
Group #4—5 female students from a suburban elementary school	"Soccer versus basketball and hockey"
Group #5—three female students from a rural middle school	"Roller Coaster Project"

Note: Conversation Topics—recorded in researcher's observational field journal and gleaned from transcripts of videotaped session. Conversations took place as students were conducting Internet searches on their research topic—Computer Lab 101B.

Computer utilization was varied and went from on-again off-again use to constant duration of more than 60 minutes at a time. There was no one pattern that emerged as students designed projects, other than every collaborative project consisted of multiple components with one of the components being a computer-generated presentation or a product that was the result of an authoring program or a word-processing program.

Findings from observations of teacher and student interaction, however, were alarming, to say the least. Behavior exhibited by teachers has been categorized into three areas: (a) the dictators, (b) the inhibitors, and (c) the risk-takers. To further explain, teachers—when working with female students and computers—either dictated what students should do, inhibited student progress, or encouraged risk-taking and inquiry. For example, videotaped transcripts show teachers lining students up in a computer lab as they proceeded to pace back and forth dictating when students should "click" to advance to another link, "scroll" down a Web site, or "conduct searches." When working ahead, students were scolded, tapped on the hand, and were told to pull away from the computers—similar to being put in "time out." The following excerpts from the researcher's observational field note entries further support the findings indicated by the transcripts:

> Researcher's Entry—Monday, June 8, 1998
>
> *Two teachers telling girls what to do—teachers pulled their chairs up to the girls' chairs so that they were touching the back of the chairs. teachers proceeded to tell girls when to use the mouse. Teachers saying, "now go here" and "scroll down now" and "now read this."*

Researcher's Entry—Tuesday, June 9, 1998

Two teachers (rural system) sitting with their girls and telling them what to do on the computers—"Type this here (pointing)" and "Go here now" and "Don't move on until I tell you."

Although every participant—teachers as well as students—took part in initial training using the Internet, the dictator teachers also had previous experience working with the Internet prior to participating in the project. In fact, five of the seven dictator teachers were at the advanced or intermediate level with regard to Internet use.

Teachers exhibiting inhibiting behaviors virtually did all of the research for the girls and completed the projects while assigning the students menial tasks such as coloring letters or cutting out pictures downloaded from Internet sites. The inhibitor teachers all had previous experience using the Internet—conducting searches, downloading information, and utilizing resources for classroom use. Observational field notes indicated that the inhibitor teachers told students each day that students did not understand what to do, therefore the teachers would complete the projects for them as shown by the following entries in the researcher's field journal:

Researcher's Entry—Tuesday, June 9, 1998

Teacher (to students)—"Go into the classroom and color the letters for the poster—I'll do the search and bring in some pictures for you to cut out. You really don't know what a project should look like, so that's (cutting) the best thing for you girls to do."

Interactions between one teacher and three students—suburban school system/Grades 7 & 8

The dictators and inhibitors combined consisted of 1 Caucasian male, 6 Caucasian females, and 5 African American females. Both the dictators and inhibitors represented a variety of backgrounds and school environments. The classroom experience of these 12 teacher participants ranged from 5 to 15 years—both beginning and mid-career. Perhaps the most interesting observations were those that involved the "risk-takers." This group of teachers consisted of 2 Caucasian males and 7 Caucasian females. Their experience ranged from 2 years to 23 years. The risk-takers represented a low-income rural school system, a suburban school system, an upper middle-class school system, and one private school.

The main characteristic that all of the risk-takers displayed was that they acted as facilitators by: (a) providing students with requested materials, (b) encouraging students to pursue interests, (c) encouraging students to utilize the Internet for information, and (d) supporting students as they designed projects that reflected their personal styles. The computer and Internet experience of these teachers ranged from the beginner to the advanced user. The variety within this group indicated that the behaviors exhibited related more to personal educational philosophy than to experience, background, technological literacy, or income (Table 6).

Table 6. Profile of Teacher Participants and Categories—Dictators, Inhibitors, and Risk-Takers

Teacher Classification	No. Years Experience	Computer Use	School
Dictator #1—Caucasian Female	23 years	Advanced	S-RCS
Dictator #2—Caucasian Female	15 years	Intermediate	S-RCS
Dictator #3—Caucasian Female	12 years	Intermediate	S-RCS
Dictator #4—Caucasian Male	25 years	Intermediate	S-RCS
Dictator #5—Caucasian Female	5 years	Advanced	S-RCS
Dictator #6—Caucasian Female	17 years	Intermediate	R-FCS
Dictator #7—Caucasian Female	19 years	Intermediate	S-LSS
Inhibitor #1—AA Female	6 years	Advanced	S-LSS
Inhibitor #2—AA Female	9 years	Advanced	S-LSS
Inhibitor #3—AA Female	21 years	Intermediate	S-MCS
Inhibitor #4—AA Female	23 years	Advanced	S-MCS
Inhibitor #5—AA Female	10 years	Advanced	R-WCS
Risk-Taker #1—Caucasian Female	24 years	Advanced	S-WCS
Risk-Taker #2—Caucasian Female	21 years	Beginner	S-WCS
Risk-Taker #3—Caucasian Female	5 years	Beginner	S-WCS
Risk-Taker #3—Caucasian Female	8 years	Intermediate	S-WCS
Risk-Taker #3—Caucasian Female	5 years	Advanced	P-FRA
Risk-Taker #4—Caucasian Female	2 years	Intermediate	R-FCS
Risk-Taker #5—Caucasian Female	5 years	Advanced	R-FCS
Risk-Taker #6—Caucasian Male	12 years	Beginner	S-LSS
Risk-Taker #7—Caucasian Male	17 years	Advanced	S-LSS

Note: Coded as follows: AA = African American; S = Suburban; R = Rural; P = Private School; Location code is followed by school code for school system or school site (LSS; MCS; FCS; FRA; RCS; WCS; WCS)

Conclusions and Implications for the Classroom

The project offered students opportunities to engage in inquiry pursuits within the areas of math and science while utilizing Internet resources and working in a single-sex environment. Referring back to the overarching questions that provided a

framework for the study, the attitudes of the students did seem to change from the beginning of the study to the culmination. Analysis of female participants' responses to the attitudinal post-workshop survey showed that girls had changed their perceptions regarding the previously stated "male-dominated" world of math, science, and computing. In addition, responses from a post-workshop evaluation seminar, which involved all student participants, revealed that out of 52 girls, all of the elementary school-age participants (35 participants in Grade 5) preferred female-only groups. However, all 52 participants also indicted that within the classroom setting—if given the choice—they would select group members differently depending on the task at hand—sometimes selecting female peers, other times selecting a combination of males and females. These findings offer the first implication for classroom teachers. By using a variety of grouping techniques within the classroom and by varying the members—sometimes giving females the opportunity to work exclusively with other females—teachers can provide further avenues for girls to succeed in math and science environments.

In the area of technology-enhanced single-sex learning environments, female participants' behavior indicated that group preference, work habits, and conversations were similar to that of male students described in previous studies conducted (Craig, 1997; Hoyles, 1998; Mac Leod, 1986). A second classroom implication is offered based on these findings. The "computer talk" and conversation that takes place while students conduct Internet-assisted research appears to be essential to the inquiry process. By considering and encouraging preferential work patterns, project design, and peer to peer conversation, teachers enable students to pursue inquiry interests within their own framework of learning.

Although teacher participants attended gender-differences awareness sessions, most did not seem to utilize the information gained from the sessions during the project. In fact, the dictator and inhibitor teachers seemed to hinder the process as girls engaged in technology-assisted inquiry. Post-workshop evaluation responses indicated that teachers planned to provide opportunities for students to engage in Internet-assisted inquiry, however further responses revealed that teachers did not feel that they treated female participants any differently than they would have if participants were males. Teacher responses extracted from the project evaluation instrument are as follows:

> *"I'm planning to use the research process in my algebra class."*
>
> *"I treat all students the same—I treated the girls the same as I always do."*
>
> *"I would treat boys the same way—they all act the same in the classroom."*
>
> *"I don't see any difference—same as what happens during the school year."*

Findings imply that data is inconclusive in the area of teachers and awareness of the gender differences that occur within the classroom setting. Perhaps, additional training sessions and insights into the process of practitioner and action research would be helpful in assisting teachers as they continue to observe mixed-sex

classrooms. The awareness sessions conducted at the onset of the study may not have been conducted at the degree of intensity needed for the teacher participants to make any permanent attitudinal changes.

There was no set pattern in terms of the teacher's level of computer use—beginner, intermediate user, or advanced user—and the manner in which they assisted the female students. Teachers reacted in a variety of ways when assisting students with technology. Behavior, however, seemed to be based more on educational philosophy than on computer experience. Unfortunately, the current media seem to indeed have a direct influence on how girls perceive their futures and careers as indicated by the results from the media-enhanced survey administered to the student participants. The addition of pictures of the television and film stars influenced career choices to the point that every participant selected a combination of the same three careers—as represented by stars—for their first, second, and third choices. These findings support previous studies conducted by Pipher (1994) and offer several implications for classroom teachers including: (a) be aware of the degree of influence the media has on female students, (b) incorporate non-traditional examples of careers found within the media in order to assist female students as they examine their choices, (c) provide strong role models within the local community to counteract what the media offers female students, and (d) engage female students in discussions regarding career choices and alternative careers that they may express interest in.

If educators must meet the needs of all students and encourage them to reach their fullest potential, classroom teachers must become aware of not only the differences between male and female students, but also that an awareness-based attitudinal change must take place. This change—in combination with an examination of media influences that are attacking young females—must be taken into consideration by every teacher who has been charged with the education of more than half of the nation's future workforce. However, this alone will not assist our young girls in drawing on their inner or true self, as described by Pipher (1994). Teachers must also examine their own philosophical framework. If traditions combined with popular culture are driving these educational philosophies and the way females are viewed within the classroom setting, then an even bigger threat is present. Educators—whose attitudes have a direct impact on the female learner—must assume a leadership role in assisting this endangered population by: (a) truly examining their educational philosophy, (b) revising that philosophy to meet the needs of young girls in the classroom, (c) assessing common attitudes towards the young female, and (d) downplaying media influences in an attempt to assist girls in meeting success. To quote Maggie Ford (1998), president of the AAUW Educational Foundation, "As student diversity changes the face of public education, and technology changes the workplace, schools must work smarter and harder to ensure that girls graduate with the knowledge and abilities they need to compete and succeed in the 21st century economy."

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